3.4 Groundwater

Review of EIS Section and Previous Analysis

In the 1992 Final EIS, groundwater was part of the soil and surface water discussion and not an independent topic. Since publication of the 1992 Final EIS, Stages One and Two of the project have been completed and regulations have changed substantially, so any original assessment of project effects and mitigation on water resources is no longer applicable. In particular, the City of Redmond has adopted a new Wellhead Protection Ordinance (2180) that would apply to the study area and its environs.

An updated analysis of groundwater conditions and the potential effects of constructing and operating the project was conducted for this addendum; the results of the analysis are summarized in this section. For more information, see the *Groundwater Discipline Report* (Parametrix 2005).

Methodology

The potential adverse effects of completing this project were assessed based on the findings of the *Groundwater Discipline Report*, which used baseline conditions from completed Stages One and Two, the *Supplement to the Redmond-Bear Creek Valley Ground Water Management Plan* (Redmond-Bear Creek Ground Water Advisory Committee 1999), and new regulations and guidelines that have been adopted since 1992.

The City of Redmond adopted Wellhead Protection Ordinance 2180 in 2003 (City of Redmond 2003). The City is required to protect public health and safety by preventing contamination of aquifers used by the city as drinking water sources. The city ordinance was developed to satisfy the following regulatory requirements:

- The Washington State Department of Health (WDOH) requires that the City develop a wellhead protection program to fulfill the public water system requirements of Chapter 246-290 WAC.
- The 1996 amendments to the Safe Drinking Water Act (SDWA) emphasize source water protection and require municipal water purveyors using groundwater to develop wellhead protection plans.
- The WDOH requires that susceptibility assessments be generated as part of the wellhead protection programs mandated under WAC 246-290.
- The Growth Management Act (GMA) requires all cities and counties to identify and pass ordinances to protect critical areas, including aquifer recharge areas (Revised Code of Washington [RCW] 36.70A), and mandates that "best available science" be used in designating and protecting critical areas (RCW 36.70A.172).

Affected Environment

The project is located in the Redmond-Bear Creek Valley Groundwater Management Area (RBCVGMA), one of five groundwater management areas designated in King County. The project footprint, however, is in the City of Redmond; therefore, the City's, rather than King County's, ordinances on groundwater protection apply to the project. The City of Redmond Wellhead Protection Ordinance 2180 specifies using certain protective measures for properties within the city limits. Groundwater resources that might be affected by this project include five wells within the city limits that Redmond uses for its municipal water supply (Figure 3.4-1). The sand and gravel aquifer that supplies these wells is highly susceptible to contamination because of its shallow depth (41 to 68 feet bgs). The intake screens of the City's water supply wells are within 50 feet bgs. Three of the five wells are located beyond 3,000 feet of the project's right-of-way; the two remaining wells lie even further from the project.

The City of Redmond Wellhead Protection Ordinance 2180 specifies graduated levels of protection around the City water supply wells, with more stringent land use limitations in the protection zones closest to the wells. Ordinance 2180 establishes three zones based on the 6-month, 1-year, and 5- to 10-year groundwater travel times (shown in Figure 3.4-1) as Wellhead protection Zones 1, 2, and 3 respectively; the *Groundwater Discipline Report* (Parametrix 2005) summarizes each zone.

Impacts

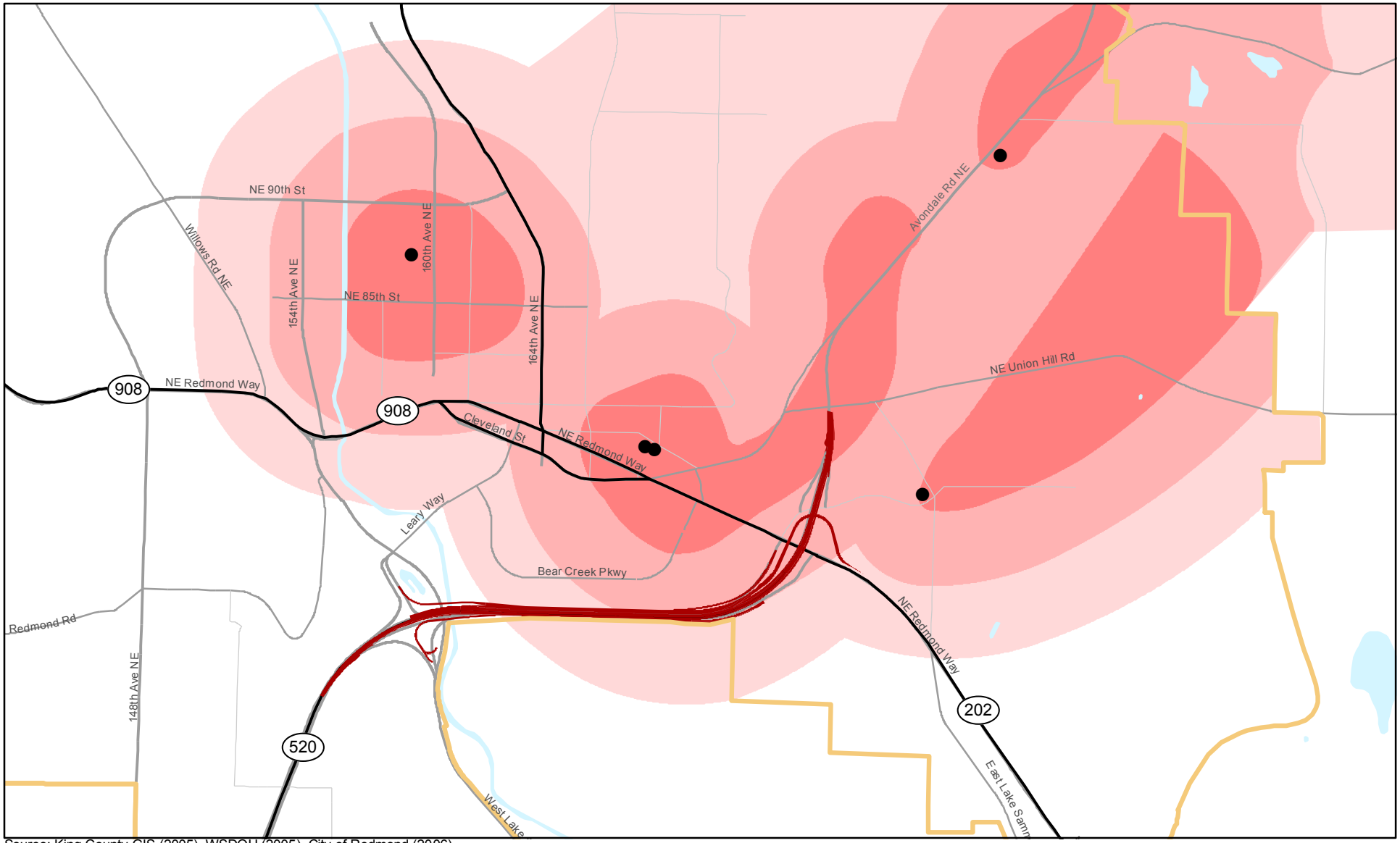
The project could affect the groundwater directly and indirectly on a temporary basis during construction and during the operation of the roadway.

Temporary Construction Impacts

Project construction activities would include disturbing soils, which could potentially turbidity and erosion. Increased turbidity can affect groundwater quality by increasing the suspended solids. Footings and construction excavation would not likely impact the shallow aquifer because it would be 10 to 15 feet in depth, which is more shallow than the aquifer. Groundwater quality could be affected by the accidental release or spill of hazardous materials during construction. An accidental spill within the recharge area of the shallow aquifer could potentially over time flow into the wellhead protection zones.

Operation Impacts

Long-term operation of the expanded roadway could affect groundwater directly by increasing impervious surface in the watershed, which could permanently change the size of the infiltration area and the quantity of infiltration occurring; this could result in decreased winter recharge and a lowered water table in the summer. On the RBCVGMA scale, however, the project impacts would not likely significantly affect recharge. Structural support columns installed during project construction might also act as preferential paths for contaminants to enter the groundwater table.



Source: King County GIS (2005), WSDOH (2005), City of Redmond (2006).

Group A Well
Zone 1
Zone 2
Zone 3
Project Footprint (Edge of Pavement)
City

N

0 0.25 0.5 Miles

FIGURE 3.4-1

City of Redmond
Wellhead Protection Zones
SR 520/West Lake Sammamish Parkway to SR 202

File Path: \\Simba\PROJ\WSDOT\184764SR520\GIS\Layouts\WellheadProtection.mxd

Mitigation Measures

Temporary effects from construction would be avoided, minimized, or mitigated by developing and implementing a TESC plan. This plan would specify BMPs, which would be implemented before and during the construction phase.

Properly maintaining and monitoring equipment during construction activities would minimize leaks, drips, and accidental spills. Accidentally releasing and spilling hazardous materials in all project segments would be avoided, minimized, or mitigated by developing and implementing an SPCC plan. The project contractor would be required to develop a SPCC plan for WSDOT approval; this SPCC plan would detail measures to prevent sediment and other construction-associated pollutants from affecting soil, air, and water quality. SPCC plan application would be consistent with the provisions of the City of Redmond Wellhead Protection Ordinance.